

A KEY TO SPECIES OF THE *CNESINUS* LECONTE
(COLEOPTERA: SCOLYTIDAE) OF NORTH
AND CENTRAL AMERICA¹

Stephen L. Wood²

In my recently completed review of the North and Central American bark beetle tribe Bothrosternini (Scolytidae) 32 species in the large and difficult genus *Cnesinus* LeConte were recognized. Because two-thirds of the species from the area have been named since the key in *Biologia Centrali-Americana* appeared, and because several years will elapse before my treatise will be published, the key to species and descriptions of previously undescribed species of *Cnesinus* from Mexico and Central America are presented on the following pages. The new *Cnesinus* species are from Mexico (2), Honduras (1), and Costa Rica (7); one of the Costa Rican species also occurs in Panama. In addition, one species of *Bothrosternus* from both Costa Rica and Panama is included.

The neotropical genus *Cnesinus* is represented in South America by approximately 35 additional species; one species occurs in the United States.

Key to the *Cnesinus* North of Panama

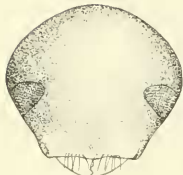
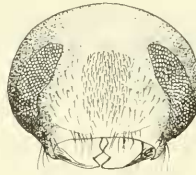
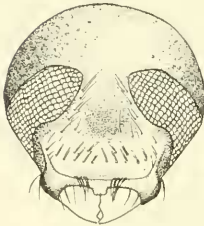
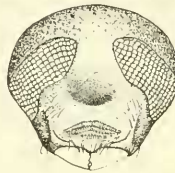
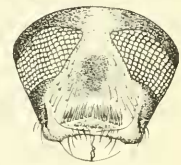
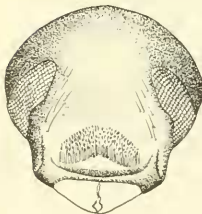
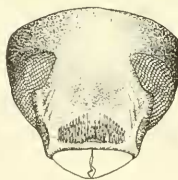
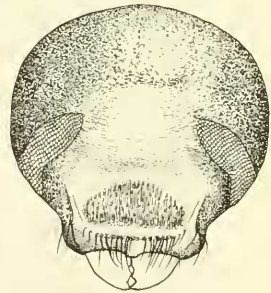
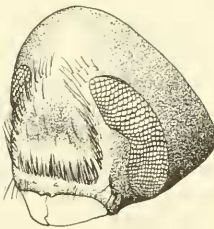
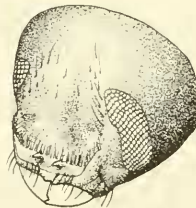
1. Elytral vestiture confined to declivity, hairlike; pronotal punctures usually elongate but ordinarily not strongly strigose; female frons without a transverse carina, an epistomal elevation may occur in either sex; striae usually less strongly impressed, the punctures larger and usually impressed individually (except *retifer*); interstitial punctures tending to be uniseriate (several exceptions) 2
- Elytral vestiture abundant, extending to base, scalelike, less commonly hairlike; pronotum longitudinally strigose (except *frontalis*); frons of one sex or both commonly with a carina or other prominent elevation; striae commonly abruptly, deeply impressed, the punctures usually partly confluent or even obsolete; interstitial punctures usually more abundant, confused 17
- 2(1). Frons devoid of an epistomal elevation in both sexes, male without conspicuous epistomal ves-

1. Part of the work that led to the preparation of this paper was supported by grants from the National Science Foundation.

2. Department of Zoology and Entomology, Brigham Young University, Provo, Utah. Scolytoidea Contribution No. 37.

- titure; entire frontal area dull, reticulate, lower area at most flattened, upper area rather strongly, broadly convex; small species, 1.6-2.2 mm. 3
- Frons with a conspicuous epistomal callus or other elevation, male sometimes also female, with at least one transverse row of stout setae on upper margin or upper slope of callus; frontal area usually partly or entirely shining, moderately to strongly impressed on at least part of lower half; size variable, 1.5-3.5 mm. 5
- 3(2). Surface of pronotum and elytra reticulate, dull; stria punctures confluent, almost entirely obsolete; declivital bristles stout, spaced within a row by distances equal to two-thirds length of a bristle, between rows by length of a bristle; Panama; 1.8-2.0 mm. (Fig. 1) *retifer* Wood
- Surface of pronotum and elytra shining; stria punctures distinct; declivital bristles somewhat more slender, spaced within rows and between rows by length of a bristle 4
- 4(3). Eyes separated by 2.2 times width of an eye; female frons between upper part of eyes transversely convex and ornamented by abundant, fine, moderately long, yellowish hair; convexity of male frons more pronounced and extensive, not more than lower third flattened; declivital striae 2 and 3 equally impressed; interspace 2 devoid of granules, 3 sometimes with a few minute granules; Costa Rica to Panama; 1.8-2.1 mm. (Fig. 2) *gracilis* Blandford
- Eyes separated by 1.5 times width of an eye; female frons transversely flat, vestiture sparse, inconspicuous; lower half of male frons flattened; declivital striae much more strongly impressed than 2, interspaces 2 and 3 each armed by a row of rounded granules; Panama; 1.5-1.8 mm. (Fig. 3) *pullus* Blandford
- 5(2). Female epistomal callus unarmed by tubercles, male callus bearing on dorsal slope a tuft of uniformly short, stout, decorative bristles (except only one row in *bicostatus* in which eyes separated by much less than width of an eye); smaller species, 1.6-2.9 mm. 6
- Female epistomal callus armed by a pair of pointed tubercles, or by a large, unpaired elevation,

male callus ornamented by not more than one uniseriate, transverse row of only slightly modified decorative bristles; eyes always separated by a distance at least as great as width of an eye; larger species, 2.5-3.9 mm. 12

1. *retifer* ♂2. *gracilis* ♀3. *pullus* ♀4. *bicostatus* ♂5. *intermedius* ♂6. *blackmani* ♂9. *electinus* ♂8. *niger* ♂7. *punctatus* ♂10. *elegans* ♀11. *degener* ♀

Figs. 1-11. Cephalic aspect of heads of *Cnesinus* spp.: 1, *retifer*; 2, *gracilis*; 3, *pullus*; 4, *bicostatus*; 5, *intermedius*; 6, *blackmani*; 7, *punctatus*; 8, *niger*; 9, *electinus*; 10, *elegans*; 11, *degener*.

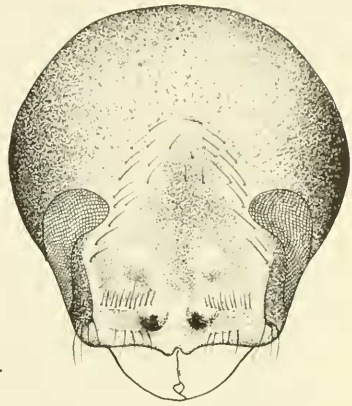
- 6(5). Eyes separated by less than 1.0 times width of an eye 7
 Eyes separated by more than 2.0 times width of an eye 9
- 7(6). Male epistomal callus poorly developed, its lower slope descending gradually, the upper slope ornamented by only one transverse row of ornamental bristles; declivital interspaces 1 to 3 feebly if at all convex; declivital interstitial vestiture consisting of rows of erect bristles and moderately sparse, fine, supplemental hair; Costa Rica; 2.3-2.6 mm. (Fig. 4) *bicostatus* Schedl
 Epistomal callus of male abruptly precipitous below, its upper slope ornamented by numerous bristles not confined to a single row; declivital interspaces rather narrowly convex; declivital vestiture consisting entirely of rows of erect, interstitial bristles; smaller species 8
- 8(7) Ornamental bristles on male epistomal callus longer, about equal in length, thickness and color to those on other frontal areas above; punctures on anterolateral area of pronotum elongate, rarely confluent; punctures of pronotum and elytra very slightly larger; Costa Rica; 1.6-1.9 mm. (Fig. 5) *intermedius* Schedl
 Ornamental bristles on male epistomal callus reddish in color, about half as long as the more slender yellowish setae on other frontal areas; punctures on anterolateral area of pronotum elongate and many confluent, appearing more nearly substrigose; punctures of pronotum and elytra very slightly smaller; Mexico to Colombia; 1.7-1.9 mm. (Fig. 6) *blackmani* Schedl
- 9(6). Body stout, less than 2.1 times as long as wide; Mexico to Panama; 2.2-3.0 mm. (Fig. 7)
 *punctatus* Blandford
 Body more slender, at least 2.4 times as long as wide; smaller species, 2.0-2.5 mm. 10
- 10(9). Pronotum rather deeply, coarsely punctured, the punctures mostly very elongate (about three or more times as long as wide), substrigose; interstriae more narrowly convex, only slightly wider than striae; Panama; 2.0-2.5 mm. (Fig. 8) *niger* Wood
 Pronotum with rather fine, shallow punctures, the punctures oval, rarely as much as twice as

- long as wide (one specimen very shallowly, minutely substrigose); interstriae less strongly convex, almost twice as wide as striae 11
- 11(10). Lower margin of male epistomal callus sharply, rather precipitously defined along an almost straight, transverse line; body 2.6 times as long as wide, pronotum with minute points between punctures (at 40 diameters magnification); striae less strongly impressed; Mexico; 2.1-2.5 mm. (Fig. 9) *electinus* Wood
- Lower margin of male epistomal callus not sharply defined, with a fine median tubercle (absent in a few specimens) on lower margin; body 2.4 times as long as wide; pronotum with minute points scarcely visible at 80 diameters; striae more strongly impressed; Mexico; 2.0-2.4 mm. *myelitis* Wood
- 12(5). Female epistomal callus armed by a pair of pointed tubercles; declivital interstriae feebly if at all convex, armed by rows of fine granules 13
- Female epistomal area armed by an unpaired median elevation; declivital interstriae narrowly convex, not high, entirely unarmed 16
- 13(12). Frons concavely impressed to slightly above upper level of eyes, the female epistomal tubercles very large; pronotal punctures obsolete, surface strongly, longitudinally strigose; discal interstriae each armed by median row of rounded granules; Mexico; 3.3-3.8 mm. (Figs. 12-13) *bicornis* Wood
- Frontal impression ending well below upper level of eyes, the female epistomal tubercles much smaller; pronotum substrigose, the elongate punctures distinct; discal interstriae unarmed by granules; smaller species 14
- 14(13). Elytral vestiture extending to disc, the ground vestiture rather abundant, stout; discal interstriae with fine granules; body stout, 2.4 times as long as wide; female frons more deeply impressed, almost flat between eyes; Mexico; 2.0-2.3 mm. (Fig. 11) *degener* Wood
- Elytral vestiture usually absent on disc, ground vestiture (when present) fine, hairlike; body more slender, more than 2.7 times as long as wide; female frons more strongly convex between the eyes; larger, 2.4-3.4 mm. 15

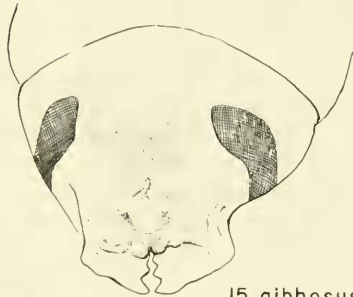
15(14). Frontal vestiture fine, shorter, less abundant; tubercles on female epistomal callus moderately large, sharply pointed; pronotum more strongly strigose; elytral striae more strongly impressed; declivital punctures slightly larger; Guatemala; 3.0-3.4 mm. *elegantis* Wood



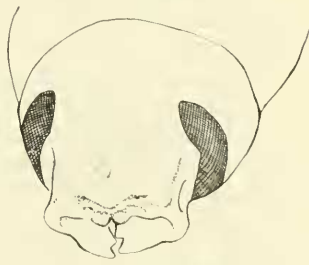
12. *bicornus* ♀



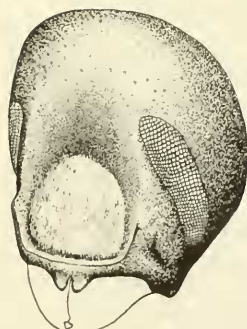
13. *bicornus* ♀



15. *gibbosus* ♀



14. *gibbulus* ♀



16. *lecontei* ♂



17. *perplexus* ♂

Figs. 12-17. Cephalis aspect of heads of *Cnesinus* spp.: 12-13, *bicornus*; 14, *gibbulus*, all setae omitted; 15, *gibbosus*, all setae omitted; 16, *lecontei*; 17, *perplexus*, including anterior part of pronotum.

- Frontal vestiture rather coarse, longer, more abundant; tubercles on female epistomal callus small, sometimes obscure; pronotum less strongly strigose; elytral striae less strongly impressed; declivital punctures slightly smaller; Mexico to Honduras; 2.4-2.8 mm. (Fig. 10) *elegans* Blandford
- 16(12). Epistoma armed by a large elevation, its sides precipitous, its summit subtriangularly flattened, the lower margin arcuate, the upper margins straight and pubescent; declivital interspace 2 convex and punctured along its summit; Costa Rica; 2.4-2.8 mm. (Fig. 14) *gibbulus* Wood
- Epistoma armed by a large pentagonal elevation, its sides precipitous, flattened on its summit, the two dorsal sides pubescent; declivital interspace 2 convex, its punctures displaced to its mesal base, the convexity impunctate; Costa Rica; 2.8-3.5 mm. (Fig. 15) *gibbosus* Wood
- 17(2). Female frons not armed by a transverse carina; male frons rather broadly impressed at least on lower half, extending in some species to above upper level of eyes; male epistoma variable, the ornamental bristles usually more extensive (entirely absent in *annectens*) 18
- Female frons armed by a transverse carina well above epistomal area and below upper level of eyes; males of several species lack a frontal impression, the impression never extending more than half the distance from epistomal margin to upper level of eyes; male epistoma ornamented by only one uniseriate, transverse row of bristles (a double row in one species) 21
- 18(17). Male frons flattened to well above level of eyes, the lower and median three-fourths occupied by a subcircular, very minutely, densely pilose area; female frons broadly, subconcavely impressed on lower two-thirds of area below upper level of eyes; vestiture on pronotum and on elytral disc fine, hairlike; Guatemala to Panama; 2.7-3.3 mm. (Fig. 16) *lecontei* Blandford
- Male frons strongly impressed below, the impression ending below upper level of eyes; epistomal callus developed, the specialized bristles much less extensive, either entirely absent or much longer; epistomal callus evident in female and usually ornamented by a transverse row of setae on its upper margin; setae on elytral disc

at least partly stout, almost scalelike; smaller species 19

- 19(18). Anterolateral angles of pronotum armed by a row of small, basally contiguous asperities; ground vestiture on elytral disc hairlike, the median row of stout bristles on each interspace at least as long as distance between rows and spaced within rows by similar distances; Costa Rica; 2.0-2.3 mm. (Fig. 17) *perplexus* Wood

Anterolateral angles of pronotum unarmed; elytral ground vestiture on disc stout, more than half as long as erect bristles, the bristles more closely spaced within the row, not more than two-thirds as long as distance between rows 20

- 20(19). Male frontal impression extending two-thirds of distance to upper level of eyes, convex above; epistomal callus narrowly carinate, occupying median two-thirds, its upper slope and lower third (or more) of impressed area bearing long, reddish, ornamental bristles; female epistomal callus evident, one transverse row of simple setae present; pronotum more coarsely strigose; strial punctures largely confluent; declivital striae rather strongly impressed; Mexico; 2.2-2.5 mm. *atavus* Wood

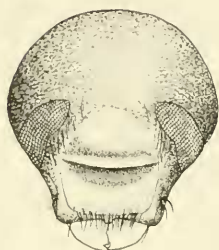
Male frontal impression extending about to upper level of eyes; epistomal callus reduced, not occupying more than median half in either sex, not ornamented by setae, except for long, fine, hair on lateral and upper margins of impression of male; pronotum obscurely strigose, rather closely granulose; strial punctures mostly distinct; declivital striae only moderately impressed; Honduras; 1.9-2.5 mm. *annectens* Wood

- 21(17). Elytral striae on disc very strongly impressed, the sutural interstriae carinate, others essentially bicarinate, with median area subsulcate and uniseriately punctured between elevated margins, vestiture hairlike; female carina almost straight, extending from eye to eye at level of ocular emargination 22

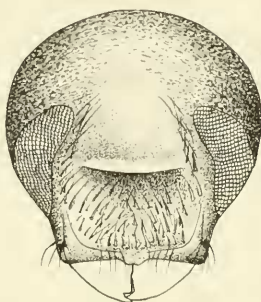
Discal interstriae flat or convex, never carinate, punctures confused, vestiture usually abundant, scalelike; female carina crescent-shaped, the arms extending dorsolaterad, usually shorter and usually located somewhat lower on frons 23

- 22(21). Smaller, 2.0-2.3 mm.; female frons above carina shining, usually with a few minute points; ground vestiture on elytral declivity less abundant, the major setae usually finer and longer; pronotal rugae usually slightly coarser; Panama and Costa Rica (Fig. 18) *costulatus* Blandford
- Larger, 2.8-3.1 mm.; female frons above carina reticulate, dull; declivital ground vestiture more abundant, the major setae usually coarser and shorter; pronotal rugae usually finer; Guatemala to Venezuela (Fig. 19) *porcatus* Blandford
- 23(21). Elytral apices extended posteriorly and broadly emarginate at suture; declivital interspaces 1, 5 and 9 elevated; discal ground vestiture on elytra consisting of broad scales, each scale almost as wide as long; Costa Rica and Panama; 1.7-2.1 mm. (Fig. 20) *squamosus* Wood
- Elytra rather broadly rounded behind, the discal vestiture on elytra slender, each seta at least four times as long as wide; declivital interstriae not conspicuously elevated 24
- 24(23). Female transverse frontal carina occupying more than two-thirds width of frontal area (at level of antennal bases), its lower margin (in median area) at level of antennal insertion; punctures of pronotum rather large, not oriented in longitudinal rows, rarely confluent; elytral vestiture consisting of rows of long slender bristles to base, the very short, sparse, ground vestiture confined to declivity; Costa Rica; 2.0-2.3 mm. (Fig. 21) *frontalis* Wood
- Female carina much shorter, usually located well above level of antennal bases; punctures of pronotum mostly oriented in longitudinal rows of four or more entirely obliterated by longitudinal confluence; ground vestiture on elytra more widely distributed and usually proportionately longer 25
- 25(24). Eyes more widely separated, separated by at least 1.8 times width of an eye 26
- Eyes more narrowly separated, separated by less than 1.6 times width of an eye (if doubtful, female frontal carina short) 30
- 26(25). Female transverse frontal carina narrow, width of frons at level of antennal insertion more than 4.0 times transverse length of carina 27

Female carina broad, width of frons at level of antennal insertion less than 2.9 times transverse length of carina 29



18. *costulatus* ♀

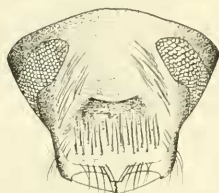
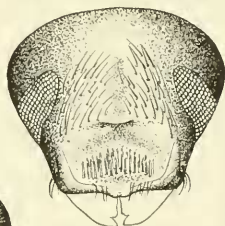


19. *porcatus* ♀

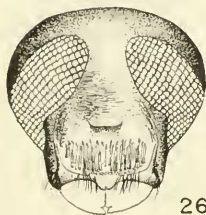


21. *frontalis* ♀

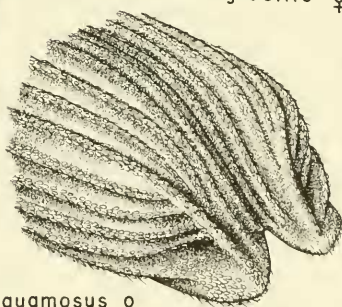
23. *atrodeclivis* ♀



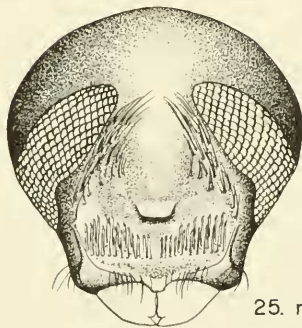
24. *strigicollis* ♀



26. *ocellaris* ♀

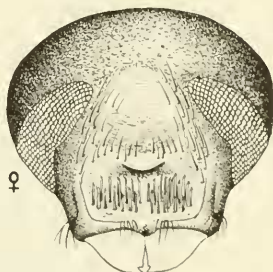


20. *squamosus* ♀



25. *minitropis* ♀

22. *minax* ♀



Figs. 18-26. Cephalic aspect of heads or posterolateral aspect of elytral declivity (no. 20) of *Cnesinus* spp. 18, *costulatus*; 19, *porcatus*; 20, *squamosus*; 21, *frontalis*; 22, *minax*; 23, *atrodeclivis*; 24, *strigicollis*; 25, *minitropis*; 26, *setulosus*.

- 27(26). Female frons rather strongly, transversely impressed immediately above carina, rather strongly convex at and above upper level of eyes; female carina very strongly elevated, almost as high as transverse length of apex; most of setae in declivital ground vestiture almost as wide as long, the longer, erect setae almost twice as long as ground vestiture; Costa Rica and Panama; 1.8-1.9 mm. *denotatus* Wood
- Female frons more nearly flattened, the carina much less strongly elevated; setae in declivital ground vestiture slender, usually four or more times as long as wide and two-thirds or more times as long as major setae 28
- 28(27). Female frons weakly convex above carina; female carina conspicuously elevated; eyes separated by 1.8 times width of an eye; declivital striae feebly impressed; Mexico; 2.5-3.3 mm. (Fig. 22) *minax* Schedl
- Female frons flattened from just below carina to above upper level of eyes; female frontal carina low, feebly elevated; eye separated by 2.2 times width of an eye; declivital striae rather strongly impressed; Honduras; 0.2-2.3 mm. (Fig. 23) *atrodeclivis* Wood
- 29(26). Discal vestiture on elytra rather coarse, the major, erect setae blunt, wider distally; female frontal carina longer, the distance between eyes only 1.8 times length of carina; interstitial granules on declivity moderately large; southeastern United States; 2.2-2.7 mm. (Fig. 24) *strigicollis* LeConte
- Discal vestiture on elytra fine, the major erect setae usually pointed, not expanded distally; female frontal carina shorter, the distance between eyes 2.4 times length of carina; interstitial granules on declivity absent; Mexico; 2.5-3.1 mm. *carinatus* Wood
- 30(25). Striae on elytral declivity more strongly impressed, the interspaces rather narrowly convex (except lower half of 2 in some specimens) and each armed by a row of small rounded granules; distance between eyes exceedingly variable, 0.6-1.6 times width of an eye, but commonly constant within a series, possibly a polytypic species; Mexico to Panama; 1.8-2.6 mm. *setulosus* Blandford

- Declivital striae feebly if at all impressed, the interstriae not elevated or armed by granules (occasional males with feeble granules on upper half); eyes separated by 1.0 or more times width of an eye; larger species 31
- 31(30). Frontal carina in female longer, the distance between eyes less than 3.5 times as long as carina; discal interstriae armed by sparse rows of very fine, rounded granules; longest declivital bristles usually much more than twice as long as ground scales; Honduras to Columbia; 2.6-3.3 mm. *adusticus* Wood
- Frontal carina in female short, low, the distance between eyes more than five times greater than length of carina; discal interstriae devoid of granules; longest bristles on elytral declivity usually much less than twice as long as ground vestiture; Costa Rica; 3.0-3.5 mm. *minitropis* Wood

SPECIES OMITTED

Two described species from Mexico are unknown to me except for the original descriptions and notes recently supplied by their author Dr. K. E. Schedl. According to Schedl's notes *quaesatus* Schedl and *garrulus* Schedl (An. Esc. Nac. Cienc. Biol., Mexico 1:331, 332, 1940) would fit into the above key near *elegantis* and *gibbulus*. He considered the male type of *quaesatus* to be synonymous with *gibbulus*. However, males of *elegantis* and *gibbulus* are almost indistinguishable. Since both are known only from the type series, Guatemala and Costa Rica respectively, it would appear the suspected synonymy is incorrectly applied to the Mexican *quaesatus* and it will be necessary to await availability of the type to resolve the question.

The type of *garrulus* evidently is a female of a distinct species closely allied to *gibbulus*; it has a much smaller, more nearly tuberculate, median, epistomal elevation than does the latter species. It is entirely possible *quaesatus* and *garrulus* could represent opposite sexes of one species.

The species represented in the key by the names *setulosus* and *paleatus* is an unusually variable species with respect to the size and spacing of eyes and in the sculpture of the pronotum. Although individual series may be very constant with respect to these characters, almost no two series are exactly the same. Because of this it is very possible that *setulosus*, *paleatus* and possibly *ocularis* represent only extreme examples of the same species.

It will be noted that several names of species described from Central America and Mexico have been omitted from the key. These names were omitted because of synonymy that will be published in

a later paper. A possible exception may be *adustus* Schedl which cannot be correctly determined until the type is available for study.

Cnesinus gibbulus, n. sp.

Fig. 14

This species and *gibbosus*, described below, are rather closely related. According to Schedl, who examined a specimen of *gibbosus*, they are allied to *gibbus* Chapuis, from Venezuela. Among species of this genus known to me they are unique. They can easily be distinguished from one another by characters given in the key to species above.

FEMALE.— Length 2.6 mm. (paratypes 2.4-2.8 mm.), 2.5 times as long as wide; color dark brown.

Frons transversely, concavely impressed at level of antennal bases, convex above, lower area largely occupied by a large median rhomboidal (subtriangular in some specimens) elevation, wider than long, with sides precipitous, the upper two sides closely pubescent, the elevation near but not reaching epistomal margin; flattened surface of elevation and convex surface above very minutely, transversely substrigose, lateral areas and vertex with fine punctures; vestiture other than on brush of elevation, sparse, inconspicuous, limited to lateral areas.

Pronotum 1.06 times as long as wide; sides straight and parallel on basal two-thirds, broadly rounded in front; punctures rather small, deep, mostly less than twice as long as wide, about a third of them confluent; scanty vestiture limited to anterior area and margins.

Elytra 1.6 times as long as wide, 1.9 times as long as pronotum; sides almost straight and parallel to declivital base, broadly rounded behind; striae impressed, the punctures rather small, individually, rather deeply impressed; interspaces about twice as wide as striae, marked by a few irregularly placed transverse lines, the punctures small, shallow, in rather indefinite rows. Declivity convex, steep; striae 1 rather strongly impressed, others less strongly impressed, the impression reduced toward apex; interstriae moderately convex, with small, deep punctures. Vestiture largely confined to declivity, fine hairlike, rather long, mostly in interstitial rows except absent on sutural interstriae.

MALE.— Similar to female except elevation reduced to a low, transverse, medially impressed ridge, pubescence equal to female; transverse frontal impression long and with a pair of small, rounded, lateral calluses; and elytral declivity more strongly impressed medially.

TYPE LOCALITY.— Villa Mills on Cerro de la Muerte, Cartago Prov., Costa Rica.

HOST.— *Quercus* sp.

TYPE MATERIAL.— The female holotype, male allotype, and 14 paratypes were collected at the type locality on June 26, 1966

(labeled August 1 in error), at an elevation of 3,100 m., by S. L. Wood, from a small broken oak branch.

The holotype, allotype, and paratypes are in my collection.

Cnesinus gibbosus, n. sp.

Fig. 15

The only allied species known to me is *gibbulus*, described above, from which this species is readily distinguished by characters given in the key to species above.

FEMALE.— Length 3.3 mm. (paratypes 2.8-3.5 mm.), 2.5 times as long as wide; color dark brown.

Frons strongly, transversely impressed just above level of antennal bases, convex above, flattened below, with median half occupied by an abruptly elevated, flat, pentagonal elevation reaching almost to epistomal margin, upper two sides ornamented by a row of stout bristles, the process higher and narrower than in *gibbulus*; upper area almost smooth, with a few punctures and inconspicuous setae in lateral areas and on vertex.

Pronotum 1.05 times as long as wide; sides straight and parallel on more than basal half, broadly rounded in front; punctures fine, deep, each three or four times as long as wide, about two-thirds of them confluent; vestiture inconspicuous except at margins, but covering entire surface.

Elytra 1.5 times as long as wide, 1.7 times as long as pronotum; sides straight and parallel to base of declivity, rather broadly rounded behind; striae impressed, the punctures small and individually impressed; interstriae about twice as wide as striae, dull, the punctures small, rather numerous, confused. Declivity impressed between interspaces 3, steep; striae impressed, the punctures small and deep; interstriae convex. 1 with a row of fine punctures, 2 and 3 almost impunctate and with row of interstitial bristles arising from mesal margin. Vestiture mostly confined to declivital area, consisting of interstitial rows of long, fine hair and some short, fine, recumbent hair; interstitial bristles absent on interspace 1.

MALE.— Similar to female except frontal elevation reduced to a broad medially impressed callus the upper margin of which is ornamented by a straight row of reddish bristles; frontal impression longer and with a pair of rounded calluses.

TYPE LOCALITY.— Volcan Poas, Heredia Prov., Costa Rica.

HOST.— An unknown woody vine.

TYPE MATERIAL.— The female holotype, male allotype, and 29 paratypes were collected at the type locality on July 14, 1963, at an elevation of 2,500 m., by S. L. Wood, from a woody vine less than 0.5 cm. in diameter.

The holotype, allotype and most of the paratypes are in my collection; two paratypes are in the Schedl collection.

Cnesinus perplexus, n. sp.

Fig. 17

This species is allied to *robai* Blackman and *coffae* Schedl, however it differs in having the declivital striae and interstriae very obscurely punctured. The tuberculate frontal carina of female *robai* is absent; and the declivity is much more shallowly excavated than in *coffae* (it is as in *robai*).

MALE.—Length 2.3 mm. (paratypes 2.0-2.3 mm.), 2.5 times as long as wide; color dark brown, the elytra slightly lighter.

Frons transversely, concavely impressed at level of ocular emarginations, convex above, below with a broad epistomal callus, the upper slope of callus ornamented by a broad, dense brush of erect, rather long, reddish hair, slightly less extensive than in *coffae*; upper area subreticulate, a few punctures and setae in lateral area; lateral margins below fundus of impression acute; epistoma, except margin, glabrous.

Pronotum 1.06 times as long as wide; sides parallel on more than basal half, broadly rounded in front; anterolateral angles armed by a row of about seven small contiguous asperites; median line narrowly, rather acutely elevated over basal two-thirds; surface coarsely, shallowly punctured, most of punctures confluent; vestiture short, coarse, conspicuous, covering entire surface.

Elytra 1.6 times as long as wide, 1.7 times as long as pronotum; sides straight and parallel to base of declivity, rather broadly rounded behind; striae impressed, the punctures small, largely confluent toward suture, discernible; interstriae twice as wide as striae, the setiferous punctures small, in rows, mostly finely granulate. Declivity steep, convex except flattened in median area; striae 1 narrowly impressed, others weakly, rather indefinitely impressed; interspace 1 weakly elevated, all with a row of fine, subgranulate, setiferous punctures, subreticulate, subshining. Vestiture of long, erect, stout, interstitial bristles from base to apex, and finer, recumbent, rather long strial and interstitial setae; the bristles about as long as distance between rows of bristles.

FEMALE.—Similar to male except frontal callus and brush reduced; and elytral declivity more coarsely punctured.

TYPE LOCALITY.—San Ignacio de Acosta, San Jose Prov., Costa Rica.

TYPE MATERIAL.—The male holotype, female allotype, and 32 paratypes were collected at the type locality on July 5, 1963, at an elevation of 1,000 m., by S. L. Wood, from twigs of two species of trees one of which was cultivated.

The holotype, allotype, and most of the paratypes are in my collection; one paratype is in the Schedl collection.

Cnesinus squamosus, n. sp.

Fig. 20

This unique species is not closely allied to any known representative of the genus. It differs from all others by the scalelike ground

vestiture on the elytra that is very broad, wider than long posteriorly; by the rather strongly elevated declivital interspaces 1, 5, and 9; by the strongly produced, suturally emarginate elytral apices; and by the sculpture of the pronotum.

FEMALE.— Length 2.0 mm. (paratypes 1.7-2.1 mm.), 2.5 times as long as wide; color brown.

Frons with a low, crescent-shaped, transverse carina at level half way between antennal bases and upper margins of eyes, convex above, moderately impressed below; tufts of rather long, close, erect reddish hair above epistomal area and at sides below carina largely obscure surface; surface granulose above, with a few short recumbent, yellow scale- and hairlike setae above carina. Eyes separated by at least 2.5 times the width of an eye. Antennal scape with a tuft of long yellow hair.

Pronotum equal in length and width; sides straight and parallel on basal two-thirds, rather abruptly narrowed then broadly rounded in front; surface coarsely, deeply, closely punctured, with rim on side opposite summit slightly elevated; vestiture abundant, covering entire surface, consisting of short scales, each about three or four times as long as wide, stouter posteriorly.

Elytra 1.5 times as long as wide, 1.6 times as long as pronotum; sides straight and parallel to declivital base, posterior profile extended into a broad emarginate process about half as long as wide; striae impressed, the punctures moderately large, mostly obscured by confluence; interstriae slightly less than twice as wide as striae, surface obscured by vestiture but evidently rather coarsely, closely punctured, at least the median row partly granulate. Declivity rather steep, ending below horizontal apical extension; interspaces 1, 2, and 5 reaching apex, 1 moderately, 5 strongly elevated, 3, 4, 6, 7, and 8 somewhat convex and ending near middle (in some paratypes 3 ends in 5), 1 strongly elevated but ending above costal margin at base of flange; costal margin raised from base of declivity to junction with 5, angulately, shallowly emarginate to suture; crests of interspaces evidently finely serrate, obscured by vestiture. Vestiture consisting of interstitial scales of two types; first, median rows of erect bristles about five or six times as long as wide, slightly shorter than distances between rows and separated from one another in the same row by less than their own length; second, broad scales, half as long as bristles, arranged with about one row on each side of row of bristles, anteriorly each slightly longer than wide, posteriorly each slightly wider than long.

MALE.— Similar to female except frontal carina and tufts of reddish hair absent, frontal impression greatly reduced, tuft of hair on scape reduced, and elytral sculpture evidently coarser.

TYPE LOCALITY.— Lower Rio Tempisque, Guanacaste Prov., Costa Rica.

TYPE MATERIAL.— The female holotype, male allotype, and 10 paratypes were collected at the type locality on March 25, 1964, at an elevation of about 15 m., by S. L. Wood, from an unknown cut vine less than 0.5 cm. in diameter. Two additional male paratypes

are labeled: Paraiso, Canal Zone, Panama, March 5 and May 1, 1911, E. A. Schwarz.

The holotype, allotype, and most of the paratypes are in my collection, others are in the U. S. National Museum; one paratype is in the Schedl collection.

Cnesinus frontalis, n. sp.

Fig. 21

This species is unique among known species in the much greater development of the female frontal carina; it is much longer, more angled, higher laterally but lower medially than in other species; both sexes lack specialized frontal vestiture. Other relationships are noted in the key.

FEMALE.—Length 2.2 mm. (paratypes 2.0-2.3 mm.), 2.4 times as long as wide; color almost black.

Frons rather shallowly impressed at level of ocular emargination, convex above, below with a very strongly elevated, subangulate carina occupying median two-thirds, its lateral angles highest; short area below carina somewhat flattened with median area distinctly raised; surface above carina reticulate; vestiture sparse, inconspicuous.

Pronotum 1.1 times as long as wide; sides straight on basal two-thirds, very slightly wider in front of middle, rather broadly rounded in front; surface rather coarsely, rather deeply punctured, each puncture about twice as long as wide, seldom confluent; vestiture hairlike, inconspicuous, except in front and at sides.

Elytra 1.4 times as long as wide, 1.4 times as long as pronotum; sides straight and parallel to declivital base, rather broadly rounded behind; striae very weakly impressed, the punctures rather large, moderately deep, close; interstriae about twice as wide as striae, almost flat, the punctures fine, deep, abundant, confused. Declivity steep, convex, somewhat flattened in median area; striae 1 slightly impressed, others not impressed, the punctures small, deep; interstriae 1 slightly elevated, 3 very slightly convex, all armed by rows of rather large, rounded granules. Vestiture largely restricted to declivity, consisting of moderately long, interstitial rows of bristles and short more abundant similar bristles, the longer ones about equal in length to distance between rows.

MALE.—Similar to female except frontal carina absent, a broad, transverse, epistomal callus present with a scanty brush of erect hair on its upper margin; a pair of small rounded calluses in frontal impression.

TYPE LOCALITY.—Puerto Viejo, Heredia Prov., Costa Rica.

TYPE MATERIAL.—The female holotype, and 20 paratypes were collected at the type locality on March 12, 1964, at an elevation of about 70 m., by S. L. Wood, from an unknown vine. The male allotype and 15 paratypes bear similar data but were taken at Peralta, Cartago Prov., Costa Rica, on March 10, 1964.

The holotype, allotype and most of the paratypes are in my collection; two paratypes are in the Schedl collection.

Cnesinus minitropis, n. sp.

Fig. 25

Among described species this one probably is most closely allied to *adustus* Schedl. It differs by the larger size and very short female carina.

FEMALE.—Length 3.1 mm. (paratypes 3.1-3.2 mm.), 2.5 times as long as wide; color very dark brown, the elytra slightly lighter.

Frons flattened on lower half, convex above, a short, transverse carina occupying less than median third; epistoma ornamented by a dense brush of long, erect, reddish bristles; surface of upper area minutely, transversely strigose, punctured above upper level of eyes; vestiture limited to epistoma and sides, setae in lateral area very long, coarse, and rather abundant near eyes. Eyes separated by less than 1.1 times the width of an eye.

Pronotum 1.03 times as long as wide; sides almost straight on basal two-thirds, widest in front of middle, rather broadly rounded in front; surface rather coarsely, longitudinally strigose, the narrow, impunctate, median line slightly elevated; vestiture mostly of fine, short, inconspicuous hair, with some scalelike setae at base and on anterior third.

Elytra 1.6 times as long as wide, 1.7 times as long as pronotum; sides straight and parallel to base of declivity, rather broadly rounded behind; striae impressed, the punctures partly confluent, but usually distinct; interstriae about twice as wide as striae, weakly convex, surface irregular, the punctures fine, abundant, confused. Declivity steep, with margins rounded, flattened on median area between interspaces 3; striae 1 slightly impressed; interspace 1 slightly elevated, the punctures rather small, deep; interstriae with median rows of small, setiferous rounded granules. Vestiture consisting of interstitial rows of erect, stout bristles separated in rows and between rows by distances equal to length of a bristle, and more abundant, narrow scales about half as long as bristles, each scale about four times as long as wide.

MALE.—Similar to female except frontal area concavely impressed over broad area, vestiture very slightly shorter.

TYPE LOCALITY.—San Ignacia de Acosta, San Jose Prov., Costa Rica.

TYPE MATERIAL.—The female holotype, male allotype, and 5 paratypes were collected at the type locality on July 5, 1963, at an elevation of 1,000 m., by S. L. Wood, from pith tunnels in twigs of a cultivated tree.

The holotype, allotype, and paratypes are in my collection.

Cnesinus degener, n. sp.

Fig. 11

This species is intermediate between *bicornus* Wood and the more closely related *elegantis* Wood, but it is much smaller and has more abundant, coarse, discal vestiture on the elytra.

FEMALE.— Length 2.1 mm. (paratypes 2.0-2.3 mm.), 2.4 times as long as wide; color dark reddish brown.

Frons as in *elegantis* except impression slightly deeper, and more feebly convex, almost flat, to well above upper level of eyes; details of sculpture, epistomal tubercles, and vestiture as in *elegantis*.

Pronotum 1.03 times as long as wide; as in *elegantis* except sculpture slightly coarser and with fine, sparse, hairlike setae over entire surface.

Elytra 1.4 times as long as wide, 1.5 times as long as pronotum; sides almost straight and subparallel on basal two-thirds, rather broadly rounded behind, declivity occupying almost posterior half; basal crenulations distinctly formed on median third, becoming a continuous, acute costa laterally; striae slightly impressed, the punctures larger than in *elegantis*, distinctly impressed, subconfluent on 1; interstriae less than twice as wide as striae, irregular, the punctures moderately large, rather abundant, confused, an indefinite median row on each finely granulate. Declivity more gradual than related species, convex, with impression between third interspaces not as deep as in *elegantis*; striae not impressed, the punctures rather small, deep; interstriae 1 abruptly, rather weakly elevated. 3 slightly, broadly elevated, 2 and 3 each armed by a median row of fine granules. Vestiture, rather abundant on disc and declivity, consisting of interstitial rows of erect, very stout bristles, each very slightly longer than distances between bristles within rows and between rows, and more abundant, semirecumbent, fine to very stout striae and interstitial ground setae, each about a third as long as the erect bristles.

MALE.— Similar to female except frontal impression not quite as deep, the epistomal tubercles absent.

TYPE LOCALITY.— Eleven km. north of Matías Romero, Oaxaca, Mexico.

HOSTS.— *Serjania* sp. (paratypes) and an unidentified woody vine (type).

TYPE MATERIAL.— The female holotype, male allotype, and five paratypes were collected at the type locality on June 24, 1967, elevation near 200 m., No. 95, in woody vine; 3 paratypes were taken 29 km. north of Matías Romero, Oaxaca, Mexico, on June 29, 1967, elevation 140 m., No. 121, in a cut *Serjania* vine; all taken by me.

The holotype, allotype, and paratypes are in my collection.

Cnesinus atavus, n. sp.

Among known forms this species evidently is more closely allied to *annectens* Wood than to any other, but the relationship is not close. From *annectens* it is distinguished by the presence of an epistomal callus in both sexes, with numerous ornamental frontal setae in the male, by the less extensive frontal impression, by the more coarsely strigose pronotum, and by the more strongly impressed declivital striae.

MALE.— Length 2.2 mm. (paratypes 2.2-2.4 mm.), 2.4 times as long as wide; color dark brown.

Frons transversely impressed at level of ocular emargination, convex above, flattened below that level; epistomal callus rather high, transversely, narrowly carinate on slightly more than median half, its upper slope bearing a large patch of long, reddish, ornamental bristles; surface of convex area to just above upper level of eyes minutely, transversely etched, granulate above; vestiture, in addition to ornamental brush, confined to sides, not conspicuous; eyes rather widely separated.

Pronotum 0.97 times as long as wide, widest just in front of middle, sides feebly arcuate on basal half, rather broadly rounded in front; surface shining, coarsely, longitudinally strigose, the grooves somewhat irregular but punctures not indicated. Vestiture short, fine, mostly abraded in central area, coarser and more conspicuous on margins.

Elytra 1.5 times as long as wide, 1.7 times as long as pronotum sides almost straight and parallel on basal two-thirds to base of declivity, somewhat narrowly rounded behind; basal margins armed by rather well developed, overlapping crenulations, an indefinite row of smaller, submarginal crenulations also present; striae impressed, the small punctures indicated but largely confluent; interstriae almost twice as wide as striae, closely marked by small, confused, subgranulate punctures. Declivity moderately steep, convex, except very shallowly impressed between third interspaces; striae impressed, perhaps wider than on disc, the punctures obscure; interstriae rather narrowly convex on upper half, the convexity greatly reduced below, the surface irregular, subgranulate. Vestiture abundant, stout, short, with median interstitial rows of erect bristles slightly longer, each bristle a little shorter than distance between rows.

FEMALE.— Similar to male except epistomal callus very slightly smaller, the ornamental bristles replaced by less abundant, less definite, coarse hair.

TYPE LOCALITY.— Three km. south Rinconada, Veracruz, Mexico.

TYPE MATERIAL.— The male holotype, female allotype, and 20 paratypes were collected at the type locality on July 6, 1967, at an elevation of 270 m., No. 170, in a large, dry, herbaceous plant characterized by a strong, distinctive odor, by S. L. Wood.

The holotype, allotype, and paratypes are in my collection.

Cnesinus denotatus, n. sp.

This species evidently is more closely allied to *frontalis* Wood than to other known species but it is easily distinguished by the smaller size, by the more finely punctured pronotum, and by the much narrower, higher female frontal carina.

FEMALE.— Length 1.8 mm. (allotype 1.9 mm.), 2.4 times as long as wide; color dark reddish brown.

Frons rather strongly impressed at level of ocular emargination, convex above, flattened below this level, with a very strongly elevated, transverse carina at level of antennal insertion, its transverse length equal to about one-fourth the distance between eyes, almost as high as wide; surface minutely reticulate-granulate; vestiture reduced, short, largely confined to lateral areas.

Pronotum 1.07 times as long as wide; sides straight and almost parallel on basal two-thirds, very slightly wider in front of middle, rather broadly rounded in front; surface shining, very closely, rather finely punctured, the punctures slightly longer than wide, mostly longitudinally confluent. Vestiture mostly on marginal areas, short, stout.

Elytra 1.4 times as long as wide, 1.5 times as long as pronotum; sides almost straight and parallel on basal two-thirds to declivital base, then rather narrowly rounded behind; crenulations on basal margins indistinct, marked by rather large, submarginal punctures; striae impressed, the punctures moderately large, partly confluent; interstriae wider than striae, subshining, the punctures fine, abundant, confused. Declivity moderately steep, convex except impressed between third interspaces; striae 1 moderately, other not impressed; interstriae 1 feebly raised, 2 weakly impressed, 3 higher but feebly convex, each with a row of setiferous granules. Ground vestiture rather abundant, stout, hairlike on disc, scalelike, almost as wide as long on declivity; rows of interstitial bristles erect, each bristle stout, very slightly longer than distance between bristles within a row or between rows.

MALE.— Similar to female except frontal carina absent, a weak, shining, epistomal callus present; declivital bristles very slightly flattened.

TYPE LOCALITY.— Barro Colorado Island, Canal Zone, Panama.

TYPE MATERIAL.— The female holotype was collected at the type locality on December 27, 1963, elevation 70 m., No. 341, at black-light. The male allotype was taken at Santa Ana, San José, Costa Rica, on October 4, 1963, elevation 1000 m., No. 219, in an *Oreopanax capitatus* twig 5 mm. in diameter; both by S. L. Wood.

The holotype and allotype are in my collection.

Cnesinus atrodeclivis, n. sp.

Fig. 23

This species is rather closely related to *minax* Schedl, but it is easily distinguished by the smaller size, by the coarser, shorter vestiture, by the more strongly impressed declivital striae, and by the more extensively flattened female frons.

FEMALE.— Length 2.2 mm. (paratypes 2.0-2.3 mm.), 2.5 times as long as wide; color dark reddish brown, declivity much darker.

Frons transversely impressed at level of antennal insertion, flattened above this level to upper level of eyes, except weakly, transversely convex between the eyes; armed at level of ocular emargi-

nation by a minute, crescent-shaped, transverse carina, its transverse length about equal to one-sixth distance between eyes; epistomal callus weakly developed, its upper slope ornamented by a rather large patch of reddish ornamental bristles; surface rather coarsely reticulate on median third, broad lateral areas above carina ornamented by rather numerous, very long, stout, yellow hair.

Pronotum 1.06 times as long as wide; shape, sculpture, and vestiture as in *denotatus* (above) except surface more nearly strigose, the punctures virtually obsolete.

Elytra 1.5 times as long as wide, 1.6 times as long as pronotum; sides almost straight and parallel on basal two-thirds to declivital base, rather narrowly rounded behind, basal crenulations very low, poorly formed, interspaces 2-4 bearing several submarginal, indistinct crenulations; striae impressed, the punctures moderately large, mostly confluent on 1 and 2; interstriae wider than striae, the punctures fine, numerous, confused, subgranulate. Declivity steep, convex except slightly flattened toward suture; striae impressed, the punctures not reduced, largely confluent; interstriae convex, each with a median row of setiferous punctures. Vestiture rather abundant, stout; ground vestiture more than half as long as bristles in interstitial rows on disc; ground vestiture and bristles merge on declivity to form closely set, almost uniseriate rows of short bristles.

MALE.— Similar to female except frontal impression extending to level of ocular emargination, convex above this level, impressed area subconcave; frontal carina absent, its ornamental bristles reduced to a single, transverse row.

TYPE LOCALITY.— Zamorano, Morazan, Honduras.

HOST.— *Valeriana scandens*.

TYPE MATERIAL.— The female holotype, male allotype and five paratypes were collected at the type locality, from the above host, on April 18, 1964, at an elevation of 700 m., No. 548, by S. L. Wood.

The holotype, allotype, and paratypes are in my collection.

Bothrosternus definitus, n. sp.

This species is rather closely related to a specimen tentatively identified from the description as *cancellatus* Chapuis. This species, however, differs in the very different frons that bears a transverse frontal carina, and in details of sculpture of pronotum and elytra.

FEMALE.— Length 3.0 mm. (paratypes 2.95-3.05 mm.), 1.9 times as long as wide; color black.

Frons convex above bases, flattened and transversely impressed below, with a fine, sharply raised carina occupying median three-fourths at level of antennal bases; closely punctured and finely, closely pubescent from carina to epistomal margin and on an area of similar size above carina; median two-thirds from pubescent area to vertex polished, marked only by minutely etched transverse lines; sides and above rugose-reticulate with shallow, indefinite punctures and short, sparse hair.

Pronotum 0.8 times as long as wide; widest behind middle, sides very strongly arcuate and strongly constricted before anterior margin, basal margin bisinuate and extending into scutellar notch; surface dull, closely, shallowly, coarsely punctured, the punctures elliptically elongate, some twice as long as wide; glabrous.

Elytra 1.2 times as long as wide; sides almost straight and parallel on slightly more than basal half, rather broadly rounded behind; striae strongly, rather sharply impressed, the punctures almost obsolete; interstriae wider than striae on disc, moderately convex on basal half, becoming narrowly carinate behind and on declivity, the punctures on basal half disc small, shallow, confused, obscure. Declivity rather steep, convex; interstriae very narrowly carinate on upper third, becoming finely beaded below; striae rugose-reticulate, the punctures obscure, much wider than interstriae.

MALE.— Similar to female except frontal carina and most of frontal pubescence absent; convex area of frons with a more definite summit just above level of antennal insertion.

TYPE LOCALITY.— Finca Gromaco on Rio Coto Brus, Puntarenas Prov., Costa Rica.

TYPE MATERIAL.— The female holotype, male allotype and 49 paratypes were collected at the type locality on July 14, 1963, at an elevation of about 500 m., by S. L. Wood, from the central axis of a subtriangular, woody vine less than 1 cm. in diameter. Six paratypes were taken at Peralta, Cartago Prov., at 500 m., by S. L. Wood, from a different woody vine; one paratype is labeled "Panama."

The holotype, allotype and most of the paratypes are in my collection, 2 paratypes are in the Schedl collection.

BIOLOGY.— The habits are much the same as *foveatus*, except that mature larvae, pupae and young adults always are arranged in their cells with the oldest nearest the entrance tunnel; they decrease in age consecutively as the distance from the entrance hole increases. In more than 30 tunnels examined of varying stages of completeness one mature female beetle was found in each; there were a few males in the mature brood. A loose, fluffy, white fungal mycelium was conspicuous in all but the newest tunnels.